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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,920	02/07/2005	Kazuhisa Mukai	MUKAI2	1923

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EXAMINER	
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ART UNIT	PAPER NUMBER
1651	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/523,920	MUKAI ET AL.	
	Examiner	Art Unit	
	Lora E. Barnhart	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,6,7 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,6,7 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendments

Applicant's amendments filed 1/7/09 to claim 1 have been entered. No claims have been cancelled or added in this reply. Claims 1, 2, 6, 7, and 21 remain pending in the current application, all of which are being considered on their merits. References not included with this Office action can be found in a prior action. Any rejections or objections of record not particularly addressed below are withdrawn in light of the claim amendments and applicant's comments.

Election/Restrictions

Applicant's election with traverse of the α-glucosyl saccharide species "liquefied starch" in the reply filed on 4/24/07 is still in effect over the claims.

Claim Rejections - 35 USC §§ 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 6, 7, and 21 remain rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamamoto et al. (1992, U.S. Patent 5,137,723).

Yamamoto teaches mixing maltose and L-ascorbic acid (L-AA) into a single solution, then adding rat intestine α-glucosidase (RIAGase) to the solution to yield 2-O-a-D-glucopyranosyl-L-ascorbic acid (AA-2G; Experiment 2; column 9, line 8, through column 12, line 44). Yamamoto teaches that AA-2G may also be made using a method in which L-AA is combined with cyclodextrin in a solution to which is added cyclomaltodextrin glucanotransferase (CGTase; Examples A-1 and A-2, column 13, line 20, through column 14, line 34). Yamamoto teaches that the yield of AA-2G is enhanced by contacting the reaction product of Example A-2 with glucoamylase (Example A-3; column 14, lines 35-62). Yamamoto teaches recovering AA-2G by purification on gel permeation and cation exchange columns, drying AA-2G with a vacuum, and isolating >99% pure crystals of AA-2G (column 9, lines 28-43 and column 13, line 32, though column 14, line 62, for example). Yamamoto teaches conducting their method using any of several α-glucosyl saccharides, including liquefied starch (column 3, line 62, through column 4, line 3).

The RIAGase and CGTase of Yamamoto are both "α-isomaltosyl glucosaccharide-forming enzymes" in accordance with claim 1 in that they combine L-AA with α-glucosyl saccharides to yield AA-2G.

The selection of the α-glucosyl saccharide to include in the reaction mixture of Yamamoto would have been a routine matter of optimization on the part of the artisan of

ordinary skill, said artisan recognizing that Yamamoto teaches that the species recited in claim 1 are functional equivalents. A holding of obviousness over the cited claims is therefore clearly required.

Claim 1 describes the α-isomaltosyl glucosaccharide-forming enzyme used in the method as being "obtained from the genera *Arthrobacter* or *Bacillus*," which is a product-by-process limitation. M.P.E.P. § 2113 reads, "Product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps."

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979)

The use of 35 U.S.C. §§ 102 and 103 rejections for product-by-process claims has been approved by the courts. "[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section

102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

As discussed above, the Patent and Trademark Office is not equipped to conduct experimentation in order to determine whether or not applicants' α-isomaltosyl glucosaccharide-forming enzyme that is obtained from *Arthrobacter* or *Bacillus* differs, and if so to what extent, from the RIAGase discussed in Yamamoto. Yamamoto's RIAGase has α-isomaltosyl glucosaccharide-forming enzyme activity (i.e., it yields AA-2G from L-AA in the presence of an α-glucosyl saccharide). The cited art demonstrates a reasonable probability that the enzyme of Yamamoto is either identical or sufficiently similar to the claimed enzyme that whatever differences exist are not patentably significant. Therefore, the burden of establishing novelty or unobviousness by objective evidence is shifted to applicants.

The mere fact that a characteristic of the enzyme of Yamamoto (e.g., the levels of AA-5G and AA-6G produced by its reaction with L-AA) was not disclosed by Yamamoto does not make methods employing that enzyme patentable. Applicant's enzyme possesses inherent characteristics which might not have been displayed in the tests used in Yamamoto; in other words, the fact that Yamamoto did not test the levels of AA-5G and AA-6G remaining in the reaction mixture does not indicate that the levels were higher than those claimed. Clear evidence that the method and enzyme of the cited prior art does not possess a critical characteristic that is possessed by the

claimed method and enzyme (i.e., the levels of AA-5G and AA-6G **across the entire scope of the claims**) would advance prosecution and might permit allowance of claims to applicants' method of using the enzyme.

Applicant alleges that the RIAGase of Yamamoto does not have the enzymatic functions recited in claim 1 (Reply, pages 8-9). Applicant includes a declaration by Tomoyuki Nishimoto (hereafter "the Nishimoto declaration") in support of patentability. The arguments and evidence have been fully considered, but they are not persuasive.

The Nishimoto declaration includes details of an experiment in which the RIAGase of Yamamoto was compared to an α-isomaltosyl glucosaccharide-forming enzyme (IMG) isolated from *Arthrobacter globiformis* A19 (i.e., an enzyme allegedly representing that employed in the claimed invention) with respect to their respective abilities to convert ascorbic acid and a glucosyl donor to 2-O-a-D-glucopyranosyl-L-ascorbic acid (AA-2G; section 9 beginning at page 3). The scope of the Nishimoto declaration is limited to investigations of a single glucosyl donor, PINEDEX #1, which is described as "a partial starch hydrolyzate [*sic*] commercialized by Matsutani Chemical Industries, Co., Ltd." However, the elected species for the glucosyl donor is "liquefied starch," a broad term that is not particularly defined in the specification and that reasonably encompasses suspensions and solutions containing unaltered starch as well as starch that has been hydrolyzed to varying degrees (e.g., to solutions of poly- or monosaccharides). See M.P.E.P. § 2111.01. The scope of the evidence provided in the Nishimoto declaration is not commensurate with that of the claimed method (even when the method is limited to the elected species) and, therefore, cannot serve to establish

the properties of the enzyme employed in the claimed method across its entire scope; neither can it overcome the obviousness rejection.

Regarding the anticipation aspect of this rejection, M.P.E.P. § 2113 explicitly indicates that once a product appearing to be substantially identical is found and a 35 U.S.C. § 102 rejection made, the **burden shifts to the applicant** to show an unobvious difference. Furthermore, regarding the obviousness aspect of this rejection, "appellants [or, in this case, applicants] have the **burden of explaining the data** in any declaration they proffer as evidence of non-obviousness." *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992); see M.P.E.P. § 716.02(b), section II. In short, the burden on establishing that proffered evidence overcomes an art rejection clearly lies with the applicant.

The glucosyl donor employed in the relevant experiments in the Nishimoto declaration is described therein as a “partial starch hydrolyzate [*sic*],” but it is not clear that this agent constitutes an example of “liquefied starch,” or indeed how the experimental evidence relates to the claim terms in any way. The examiner investigated the trade name “PINEDEX #1,” but a thorough search failed to provide consensus in the art as to the physical and structural properties of the composition referenced by this trade name, and applicant has provided no clarification on this point.

To be given substantial weight in the determination of obviousness or nonobviousness, evidence of secondary considerations must be relevant to the subject matter as claimed, and therefore the examiner must determine whether there is a nexus between the merits of the claimed invention and the evidence of secondary

considerations. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 305 n.42, 227 USPQ 657, 673-674 n. 42 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1017 (1986). See M.P.E.P. § 716.01(b). Applicant has not satisfactorily established that the evidence provided in the Nishimoto declaration is relevant to the subject matter as claimed, and the examiner has therefore determined that there is no nexus between the proffered evidence and the claimed method.

The as-filed specification was thoroughly reviewed for evidence that supports applicant's contention of patentability. In particular, Experiment 4 at pages 23-24 was considered, since this experiment appears to investigate the ability of applicant's IMG enzyme to act on various glucosyl donors (see page 23, lines 6-12). However, it is not clear which glucosyl donor was employed to yield the evidence presented in Table 2 (page 24), and the specification does not appear to include experimental data on all of the species of glucosyl donors referenced in Experiment 4. Even given the Nishimoto declaration, the whole of the experimental evidence presented by applicant does not clearly indicate any allowable subject matter.

No claims are allowed. No claims are free of the art.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lora E. Barnhart whose telephone number is (571)272-1928. The examiner can normally be reached on Monday-Thursday, 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lora E Barnhart/
Primary Examiner, Art Unit 1651